Technical Series 00-146

TEN STEPS TO A COOLER PLANET

Introduction

The evidence is all around us that our climate is changing dramatically: floods, hurricanes, droughts, scorching summers, melting glaciers and disappearing ice shelves in the polar regions. The consensus among the scientific community is that these trends are due at least in part to human activities—in particular, those activities that release "greenhouse gases". These gases are accumulating in our atmosphere and changing the intricate balance that has sustained life on earth for millions of years.

Climate change is a global problem, so the solution has to be global too. Along with other countries, Canada made a commitment to reduce greenhouse gas emissions at a meeting in Kyoto, Japan in 1997. Canada's commitment says we will reduce our emissions by 6 per cent below our 1990 emissions by the year 2012.

That doesn't sound like much, but even this modest target is being widely missed. In fact, as a nation, our emissions have been increasing since 1990, not decreasing. Between 1990 and 2000, our emissions rose by 15 per cent. If this trend continues, we can expect to have increased our emissions about 25 per cent over 1990 levels by 2012. By then, we'll be 31 per cent over the Kyoto target. But according to many scientists, the Kyoto target is just a first step to stabilizing the world's climatic systems. To achieve this more ambitious goal, we may have to reduce emissions 60 per cent below 1990 levels—about 75 per cent below current levels!

A lot of people think there is little they can do to help. In fact, greenhouse gases (primarily CO_2) are emitted whenever and wherever fossil fuels are burned, such as in the cars we drive, in our oil or gas burning furnaces, and in the generating stations that produce electricity for us to use at home. When taken together, these "personal" sources account for about 35 per cent of the total greenhouse gases coming from Canada. So our transportation choices, and how we heat, cool and light our homes can make a big difference to the planet.

It's true that businesses are even a bigger source of greenhouse gases. But these businesses are making products for us to consume and the energy they use ends up "in" the products that we buy: cars, homes, toys, appliances, food and so on. This is the "embodied energy" that we are responsible for, even if we put the car up on blocks or never turned on the air conditioner. Another way of saying this is if we purchased fewer consumer products, there would obviously be less greenhouse gases emitted by businesses.

There is good and bad news in all this. The bad news is that human beings as a species are notorious for doing little about problems until they reach crisis proportions. The good news is that the changes to the way we live, work, play and travel that reduce our emissions have so many other benefits that we may just want to make them anyway.

These benefits include saving money on energy, living in healthier and more comfortable homes, getting more exercise from walking and biking instead of driving, improving air quality and reducing environmentally related illness. If you own your home, you will be happy to hear that making it energy-efficient will also improve its resale value. And on a social level, a more stable climate will help us avoid the damages and injuries (and huge insurance payouts) associated with extreme weather.

So we all have to do our part and we will all share in the benefits.

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HOME TO CANADIANS

Canada

The following information is provided in order to help you decide how you can best contribute to the long-term health of the planet. It's important to realize that you don't have to turn your life upside down in order to make a significant contribution. The secret is to make choices that gradually but consistently move you towards lower emissions over a longer period: when it is time to move, take house size, heating system, and transportation options into account. When it's time to replace burned out light bulbs or worn-out appliances choose the highest efficiency items you can afford. When you are planning major renovations to your home, consider investing in high-performance windows and doors.

In order to put the numbers below into perspective, consider that a sample Canadian household of two adults and two children in a 230 m^2 (2,500 square foot) house (including heated basement) with one car will add about 27,650 kg of CO_2 per year to our atmosphere. A 6 per cent reduction would mean finding ways to eliminate only 1659 kg per year. A 60 per cent reduction would mean eliminating 16,590 kg per year. You set your own target!

Don't Drive it, Transit!

A typical Canadian household with one mid-size car emits about 5,500 kg of CO_2 per year by driving about 20,000 kilometres.

If you use a vehicle regularly, one of the single most important things you could do would be to switch some of your local travel to public transit. For a mid-size car, this can rack up savings of 230 kg of CO_2 per year for each 1,000 kms you travel by local transit. This means that if you commute 25 kilometres each way to work, you could save over 2,500 kg of CO_2 per year by taking the bus or subway. You would also save yourself the headache of driving in traffic jams and get through that novel that has been sitting by your bedside for the last three months by bringing it with you on the bus!

Smaller... Smaller... Gone!

Canadians are buying larger and larger vehicles, with trucks, vans and sport utility vehicles now outselling cars. Although the fuel efficiency of engines has increased, the larger engines in current models neutralizes this effect.

You can do a serious favour for the planet by dropping your car size down a notch or two. You save on two fronts: smaller vehicles use less energy in day-to-day operation and they take less energy to build. For instance, you can save almost 1,100 kg CO_2 per year in going from a mid-size to a small-size car or almost 2,600 kg CO_2 per year in going from a minivan to a mid-size car. Of course, the ultimate (from a planetary point of view) would be to get rid of your vehicle entirely. If you are in a position to ditch your car (or not to buy one in the first place) you can save the full 5,500 or so kg of CO_2 per year and use the $6,000 a year (which the average Canadian spends on keeping a vehicle) for something more planet-friendly!

To Air is Human, But...

People in a typical Canadian household of four fly about 12,500 kilometres per year (taken together) releasing about 3,100 kg of CO_2.

For long trips, air travel is usually the quickest way of getting from point A to point B. Unfortunately, it is also less energy-efficient compared to alternatives such as bus or train (but about the same as travelling alone in a small car). For instance, to travel 1,000 kilometres by train would produce about 150 kg of CO_2 whereas flying the same distance would emit 250 kg of CO_2. Another way to save would be to make fewer long distance trips by, for instance, combining business and vacation travel. For each 6,000 km round-trip by air avoided, you can save 1,500 kg of CO_2. After all, there's always the phone!

Home Heat Home

The typical Canadian household emits about 7,700 kg of CO_2 per year from energy used for home heating. The actual amount depends on the type of energy used (electricity, oil or gas) and on the province in which you live (some provinces produce electricity by burning greenhouse gas-intensive fossil fuels while others use nuclear or hydro power).

Space heating accounts for one of the largest chunks of most household emission profiles. If you live in an older, drafty home with poor insulation, you can reduce these emissions by up to 75 per cent by improving the energy-efficiency of your house. For instance, caulking your doors and windows and installing transparent plastic over windows during the winter are easy and effective ways to reduce heating-related emissions. If you want to make bigger cuts, consider hiring a professional to improve the insulation in your walls and attic. If you want to go all the way, install high efficiency windows and doors when undertaking renovations to your home. Setting your thermostat at a lower temperature can also reduce your heating-related emissions—about 525 kg of CO_2 per year for each 1° C in a typical house. Measures to conserve energy will not only reduce your greenhouse gas emissions, but will also save you money and make your home more comfortable by reducing drafts and cold spots in the winter.

Make Every Square Foot Count!

For each square foot of housing we occupy, we contribute about 5.9 kg/year (depending on energy source and province) to the national greenhouse gas total.

Houses in Canada have been getting larger over the decades even though the number of people per house is falling. This means that on average, our consumption of sheer living space has risen substantially over the years. Needless to say, larger houses take more energy to build and use more energy to operate. While some Canadians are underhoused and could clearly use more space, others – for example those with kids flying the coop—are overhoused and could make due with less. Next time you move, you can reduce your greenhouse gas emissions (and housing expenses) by choosing a smaller house. For each reduction of 100 square feet, you save 590 kg of CO_2 per year.

Some Electrifying Numbers

The use of appliances (such as fridge, stove, washer-dryer unit and dishwasher) in the typical Canadian home produces about 2,300 kg of CO_2 a year. Lighting emits about 700 kg of CO_2 per year and central air conditioning accounts for another 2,000 kg. In some homes, emissions from electricity use may approach or surpass emissions from space heating or driving!

When buying appliances, choose the most energy efficient models. If you replace average efficiency appliances with the highest efficiency ones you can cut your electricity bill and save up to 400 kg of CO_2 per year. For instance, a high-efficiency fridge can reduce your emissions by 60 kg per year, a washer by 176 kg per year and a dishwasher by 115 kg per year. The embodied energy for small appliances like computers or TVs is about 25 kg CO_2 per year and large items like fridges and stoves are about 50. This means that you can substantially reduce your emissions by getting rid of the old appliance and buying a new, more energy efficient one. However, most people would probably wait until the old one is ready to give up the ghost before investing in a new appliance. Energy efficiency goes for lighting as well. You can save 250 kg CO_2 per year by replacing ten frequently used lights with compact fluorescent bulbs. In the summer, you can reduce emissions by turning off (or down) your air conditioning. Switching off a central air conditioner in a typical house of 2,500 square feet will save a full 2,000 kg CO_2 per year. If you have room air conditioners, switching them off will save about 425 kg per year per room.

What's Hot? A Matter of Degree

Heating water in the typical Canadian household emits about 2,500 kg of CO_2 per year, sixty per cent of it in taking showers and baths.

Many Canadians keep their water heaters at temperatures higher than necessary: 50° C is usually hot enough. A household of four can reduce its greenhouse gas emissions by 320 kg CO_2 per year for each 5° C the heater is turned down for an electric water heater, or 190 kg per year for gas. You can also reduce emissions by wrapping your water heater in a thermal blanket. Wrapping up a poorly insulated electric water heater can save your household up to 290 kg CO_2 per year (or 104 kg per year for a gas heater). Low-flow shower heads will help you reduce your hot water use and save up to 140 kg per year. Doing your laundry in cold water instead of hot will save a typical household about 215 kg CO_2 per year for each load (on average) you do per week.

Diet for a Warming Planet

The food eaten by a typical Canadian with a meat-based diet accounts for about 860 kg of CO_2 per year.

Believe it or not, your diet can have an impact on global warming. Energy is used to create the chemicals used on farms, to run farm machinery and to process food into canned or packaged products. Meat production is particularly energy-intensive (compared to grains, fruits or vegetables). You can reduce your emissions by 445 kg/year for each person in your household by switching to a meatless diet. Energy is also used to transport food — many food items travel more than 2,000 kilometers before they reach your dinner table. You can slice 40 kg per year off your emissions for each person in your household by buying locally produced food when in season.

Waste Not, Emit Not

Garbage typically accounts for about 1,500 kg CO_2 per year for a household of two adults and two children in Canada.

Canadians are the garbage kings of the world, generating more waste per capita than almost any other country. The garbage you put at the curb every week contains embodied energy that is being wasted instead of being reused or recycled. It also takes considerable amount of energy to truck and dispose of this garbage. The best way to reduce emissions is to minimize your garbage production: by refusing to purchase products that you don't really need, reducing the quantity of goods you purchase (especially disposables), avoiding goods with heavy packaging, and by reusing products as much as

possible before disposing of them. You can subtract 300 kg of CO_2 per year from your emissions by putting out one less bag per week. Recycling also helps reduce emissions by recovering some of the energy that would have been otherwise wasted. For each bag of garbage put out per week that you eliminate through recycling you can save 160 kg of CO_2 per year.

The Ultimate Power

True green power has no CO_2 emissions. Therefore every kWh supplied from green power displaces 0.5 kg CO_2.

About 20 per cent of electricity used in Canada is generated by burning fossil fuels such as coal, natural gas and oil—obvious greenhouse gas villains. Another 62 per cent is generated using hydro power, which many people think of as "clean energy" because it does not directly cause air pollution or emit greenhouse gases. However, hydro power is made possible by damming rivers and flooding vast areas of land—often forested land. Not only does this destroy trees that would otherwise be absorbing CO_2 and buffering us against climate change, but the submerged trees eventually decompose and emit methane, itself a powerful greenhouse gas. Furthermore, when we use hydro power, we have less electricity to export to our neighbours in the U.S. There, most electricity is generated from fossil fuels, so the environmental cost of consuming electricity here is better measured in terms of the impacts of using more coal, gas or oil there. Thus, most of the electricity used in Canada—either directly or indirectly—causes greenhouse gas emissions. In response, some utilities are beginning to introduce Green Power options for people who are willing to pay a premium price for sustainably produced electricity. If you switch to Green Power, you can reduce or eliminate (depending on how much Green Power you buy) your electricity-related CO_2 emissions and contribute to the development of renewable energy sources, such as wind, solar, small-scale hydro, and biomass.

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Housing Research at CMHC

Under Part IX of the *National Housing Act*, the Government of Canada provides funds to CMHC to conduct research into the social, economic and technical aspects of housing and related fields, and to undertake the publishing and distribution of the results of this research.

This fact sheet is one of a series intended to inform you of the nature and scope of CMHC's research.

The **Research Highlights** fact sheet is one of a wide variety of housing-related publications produced by CMHC.

For a complete list of **Research Highlights**, or for more information on CMHC housing research and information, please contact:

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